

Public and Governmental Participation in
Final Remedy Selection for Groundwater Contamination
From Badger Army Ammunition Plant

May 19, 2011

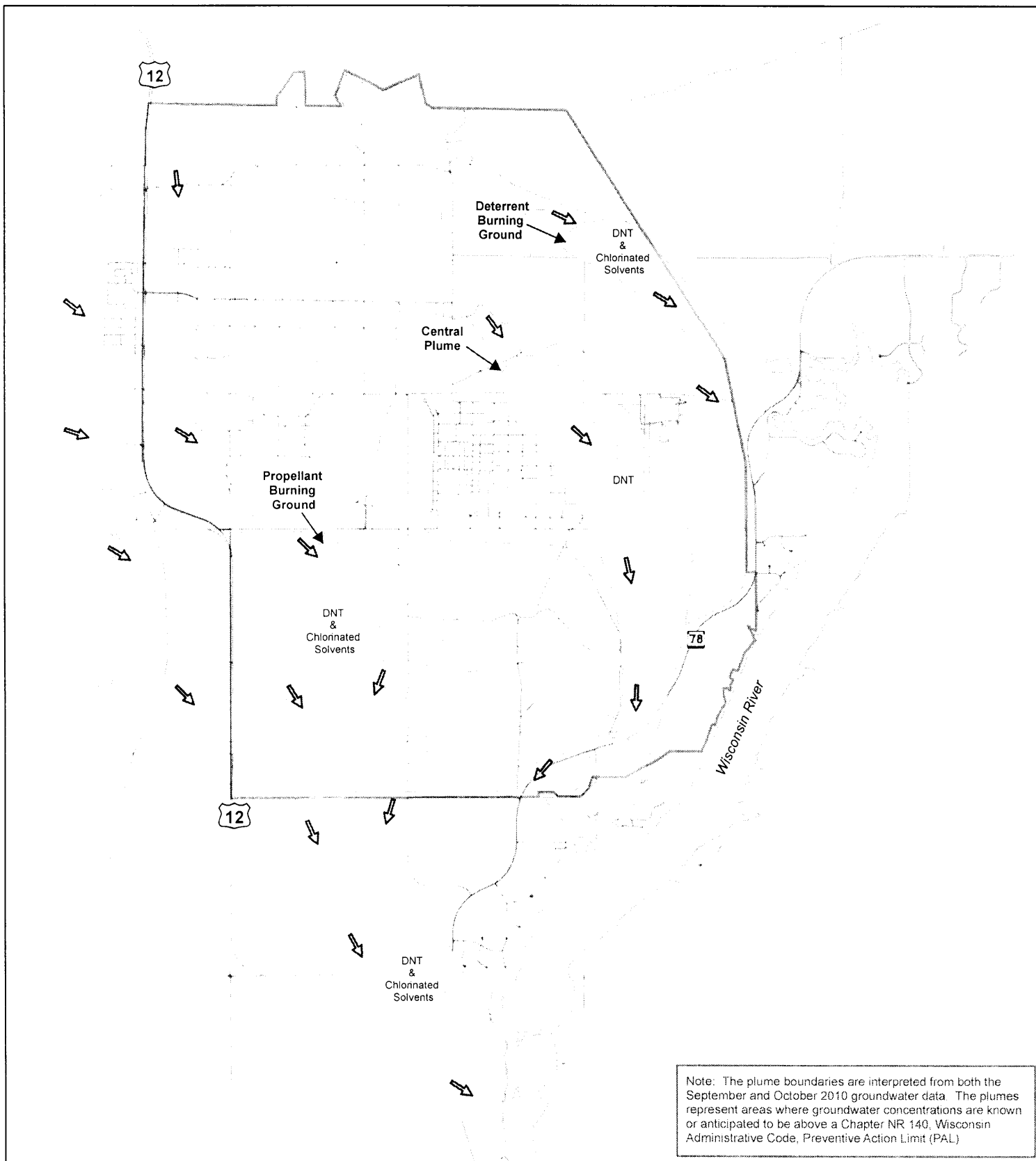
BACKGROUND:

The U.S. Army has submitted an Alternative Feasibility Study to the Wisconsin Department of Natural Resources (WDNR) to determine the final remedy for contamination that is affecting groundwater, rivers, wetlands, and springs in and near Badger Army Ammunition Plant. The public – including local, state, tribal and federal government – will soon have an opportunity to submit public comment on this pivotal decision-making process.

RECOMMENDED ACTION:

Public comment submitted to the WDNR should encourage a solution to groundwater contamination in and around Badger Army Ammunition Plant that will:

- prevent undue hardship to local farmers
- prevent undue hardship to area residents particularly those with low or fixed income
- prevent potential human exposures to contaminants in well water through ingestion, inhalation, and dermal contact
- protect and prevent contamination of existing and future livestock wells
- protect and prevent contamination of existing and future municipal water wells
- prevent potential human exposures to contaminants through vapor intrusion
- prevent potential human exposures to contaminants in irrigation well water through inhalation, the human food chain, and direct contact
- prevent potential human exposures to contaminants in surface water through dermal contact and incidental ingestion
- prevent further contamination of wetlands and wetland ecosystems
- prevent further contamination of lakes, streams, rivers, natural springs, and aquatic ecosystems
- prevent exposure of wildlife and domestic animals to contaminants in surface water resources used for drinking
- prevent the movement of contaminants to groundwater, wetlands, sediments, springs, and surface water
- achieve prompt compliance with all environmental and public health standards, preventive action limits, and advisories and discourage exemptions and non-compliance
- and will not compel the public and affected residents to choose between the offer of municipal water and environmental quality where they live, work and play.



Legend







-  Badger Army Ammunition Plant Boundary
-  Paved Road
-  Groundwater Flow
-  Groundwater Plume
-  Wisconsin River
-  Dinitrotoluene

Figure 6
Groundwater Plumes
Alternative Feasibility Study
Groundwater Remedial Strategy
Badger Army Ammunition Plant

1 inch = 3,750 feet

0 2,800 5,600 11,200 Feet

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DEPARTMENT OF THE ARMY
BADGER ARMY AMMUNITION PLANT
2 BADGER ROAD
BARABOO, WISCONSIN 53913-5000

April 27, 2011

SUBJECT: Alternative Feasibility Study – Groundwater Remedial Strategy

Mr. Jeff Ackerman
Hydrogeologist
Wisconsin Department of Natural Resources
South Central Region
3911 Fish Hatchery Road
Fitchburg, WI 53711-5397

Dear Mr. Ackerman:

Enclosed please find a compact disc (CD) containing the Alternative Feasibility Study (AFS) – Groundwater Remedial Strategy for your review and approval. Please note that five of the figures in this report are large format and hard copies are being furnished for your convenience.

This report documents the selection of a remedial alternative for the groundwater plumes at the Badger Army Ammunition Plant (BAAAP). The three remedial alternatives evaluated in the AFS are Interim Remedial Measures/Modified Interim Remedial Measures (IRM/MIRM) treatment, in-situ biochemical treatment, and a public water system.

The Department of the Army (Army) recommends that a public water system be installed as the final remedy for the groundwater plumes at BAAAP. This remedy meets the remedial action objective and regulatory requirements because it is protective of human health and the environment and eliminates downgradient drinking water receptors. The Army is requesting concurrence from the WDNR that a public water system is an acceptable final remedy.

Please do not hesitate to contact me at 608-643-3361 if you have any questions.

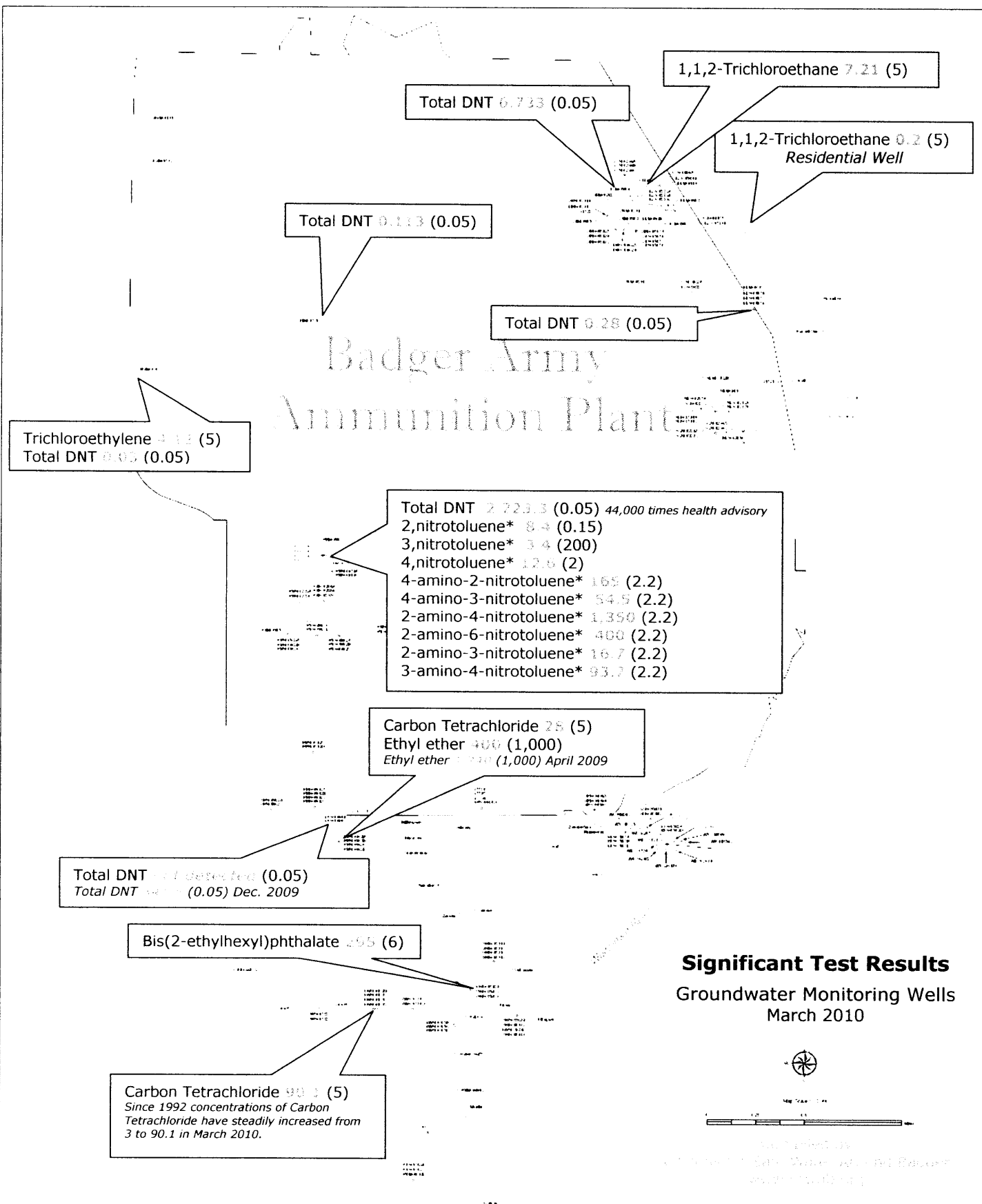
Sincerely,

A handwritten signature in cursive script, reading "Joan M. Kenney".

Joan M. Kenney
Commander's Representative

Enclosure

Copy furn: Peter Ramanauskas, USEPA
Rick Walgenbach, Dairy Forage Research Center
Henry Nehls-Lowe, Wisconsin Department of Health and Family Services
Larry Garvin, Ho-Chunk Nation
Samantha Greendeer, Ho-Chunk Nation
Scott Doig, U.S. Department of the Interior Bureau of Indian Affairs
Ralph Jesse, U.S. Department of Agriculture
Badger Technical Services, LLC
SpecPro, Inc.
(All w/CD only)



Notations: All groundwater test results are in micrograms per liter (parts per billion).

The first number is the Army's reported laboratory test result for that contaminant; the second number in (parentheses) is a recommended health-based threshold for drinking water. For contaminants without a standard or advisory, EPA Region 3 health screening values for tap water were used. DNT = Dinitrotoluene (a carcinogenic explosive). Compounds with an asterisk (*) are degradation or biological transformation products of DNT and are currently NOT targeted parameters in the Army's testing methods for private wells near Badger Army Ammunition Plant.

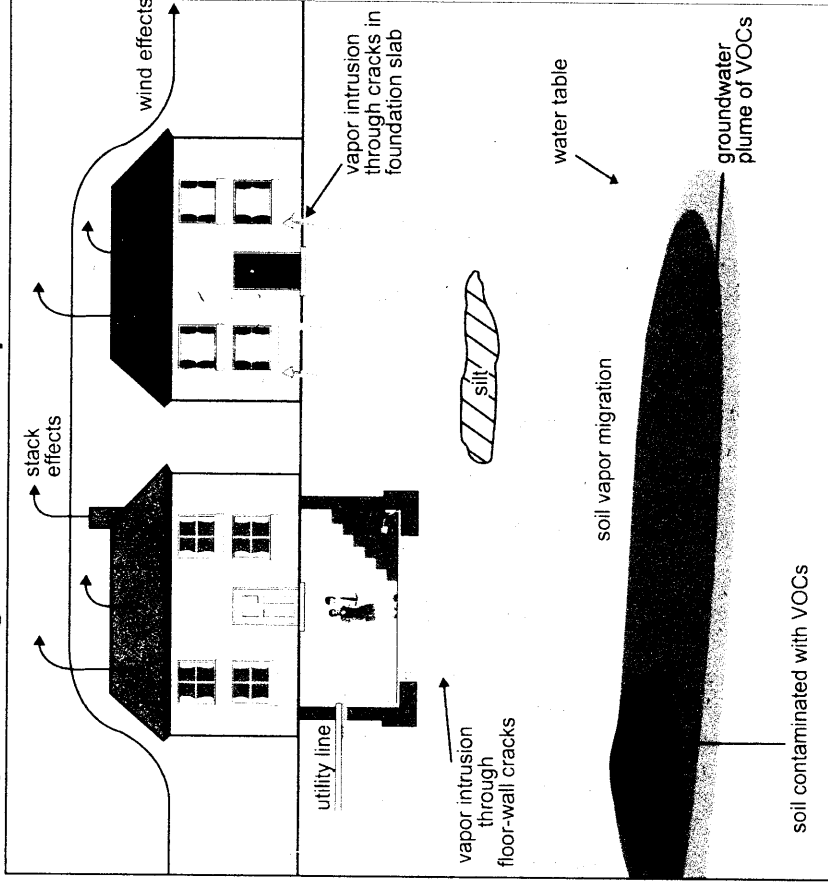
Vapor intrusion generally occurs when there is a migration of volatile chemicals from contaminated groundwater or soil into an overlying building. Volatile chemicals can emit vapors that may migrate through subsurface soils and into indoor air spaces of overlying buildings in ways similar to that of radon gas seeping into homes. Volatile chemicals may include volatile organic compounds, select semivolatile organic compounds, and some inorganic analytes, such as elemental mercury, radon, and hydrogen sulfide.

In extreme cases, the vapors may accumulate in dwellings or occupied buildings to levels that may pose near-term safety hazards (e.g., explosion), acute health effects, or aesthetic problems (e.g., odors). Typically, however, the chemical concentration levels are low or, depending on site-specific conditions, vapors may not be present at detectable concentrations. In buildings with low concentrations of volatile chemicals, the main concern is whether the chemicals may pose an unacceptable risk of chronic health effects due to long-term exposure to these low levels. A complicating factor in evaluating the potential chronic risk from vapor intrusion is the potential presence of some of the same chemicals from emission sources in the building (e.g., household solvents, gasoline, cleaners) that may pose, separately or in combination with vapor intrusion, a significant human health risk.

The simple conceptual model of the vapor intrusion pathway that is presented in Figure 1 illustrates a source of contamination in soil and groundwater and the upward movement of VOCs from this source toward and into buildings.

(Source: The 2008 Brownfields Technology Primer: Vapor Intrusion Considerations for Redevelopment, EPA 542-R-08-001.)

Figure 1. Migration of Soil Vapors to Indoor Air



This figure depicts the migration of volatile chemicals from contaminated soil and groundwater plumes into buildings. Volatile chemicals are shown to enter buildings through cracks in the foundation and openings for utility lines. Atmospheric conditions and building ventilation are shown to influence vapor intrusion. (Source: EPA 2008.)